We claim:

1. A projection optical system which projects an image of a first surface onto a second surface, comprising:

a lens component formed of fluorite;

a lens component formed of quartz;

a first lens group including at least one lens component formed of fluorite and having a positive refractive power;

a second lens group arranged in an optical path between the first lens group and the second surface and having a negative refractive power; and

a third lens group arranged in an optical path between the second lens group and the second surface and having a positive refractive power;

wherein when the number of the lens components formed of quartz is Snum, the number of the lens components formed of fluorite is Cnum, and a numerical aperture of the second surface side of the projection optical system is NA, the following conditions are satisfied:

$$Snum > Cnum$$

$$NA > 0.75.$$

2. The projection optical system as set forth in claim 1, wherein at least one lens component among the lens components formed of fluorite in the first lens

group has a positive refractive power.

3. The projection optical system as set forth in claim 2, wherein the third lens group has at least one lens component formed of fluorite.

4. The projection optical system as set forth in claim 3, wherein when the distance between the first surface and the second surface is L, the distance between the first surface and the lens surface of the first lens group closest to the second surface side is L1, and the focal length of the second lens group is f2, the following conditions are satisfied:

$$0.2 < L1 / L < 0.5$$

$$0.03 < -f2 / L < 0.10.$$

5. The projection optical system as set forth in claim 4, wherein the first lens group has at least one aspherical lens surface.

6. The projection optical system as set forth in claim 5, wherein the lens groups which form the projection optical system are the first, second and third lens groups only.

7. The projection optical system as set forth in claim 6, wherein the projection optical system is optimized with respect to light having a center wavelength of 200 nm or less.

8. The projection optical system as set forth in claim 2, wherein when the distance between the first

surface and the second surface is L, the distance between the first surface and the lens surface of the first lens group closest to the second surface side is L1, and the focal length of the second lens group is f2, the following conditions are satisfied:

$$0.2 < L1 / L < 0.5$$

$$0.03 < -f2 / L < 0.10.$$

9. The projection optical system as set forth in claim 2, wherein the first lens group has at least one aspherical lens surface.

10. The projection optical system as set forth in claim 2, wherein the lens groups which form the projection optical system are the first, second, and third lens groups only.

11. The projection optical system as set forth in claim 2, wherein the projection optical system is optimized with respect to light having a center wavelength of 200 nm or less.

12. The projection optical system as set forth in claim 1, wherein the third lens group has at least one lens component formed of fluorite.

13. The projection optical system as set forth in claim 1, wherein when the distance between the first surface and the second surface is L, the distance between the first surface and the lens surface of the first lens group closest to the second surface side is

L1, and the focal length of the second lens group is f2, the following conditions are satisfied:

$$0.2 < L1 / L < 0.5$$

$$0.03 < -f2 / L < 0.10.$$

14. The projection optical system as set forth in claim 1, wherein the first lens group has at least one aspherical lens surface.

15. The projection optical system as set forth in claim 1, wherein the lens groups which form the projection optical system are the first, second, and third lens groups only.

16. The projection optical system as set forth in claim 1, wherein the projection optical system is optimized with respect to light having a center wavelength of 200 nm or less.

17. A projection exposure apparatus which projects and exposes a reduced image of a pattern arranged in a projection negative plate onto a workpiece, comprising:

a light source having a center wavelength of 200 nm or less;

an illumination optical system which guides exposure light from the light source to the pattern on the projection negative plate; and

the projection optical system as set forth in claim 1;

wherein the projection negative plate can be arranged at the first surface, and the workpiece can be arranged at the second surface.

18. A projection exposure apparatus which projects and exposes a reduced image of a pattern arranged in a projection negative plate onto a workpiece, comprising:

a light source having a center wavelength of 200 nm or less;

an illumination optical system which guides exposure light from the light source to the pattern on the projection negative plate; and

the projection optical system as set forth in claim 2;

wherein the projection negative plate can be arranged at the first surface, and the workpiece can be arranged at the second surface.

19. A projection exposure method which projects and exposes a reduced image of a pattern arranged in a projection negative plate onto a workpiece, comprising the steps of:

supplying exposure light having a center wavelength of 200 nm or less;

guiding the exposure light to the pattern on the projection negative plate; and

projecting an image of the pattern on the

projection negative plate arranged at the first surface onto the workpiece arranged at the second surface by using the projection optical system as set forth in claim 1.

20. A projection exposure method which projects and exposes a reduced image of a pattern arranged in a projection negative plate onto a workpiece, comprising the steps of:

supplying exposure light having a center wavelength of 200 nm or less;

guiding the exposure light to the pattern on the projection negative plate; and

projecting an image of the pattern on the projection negative plate arranged at the first surface onto the workpiece arranged at the second surface by using the projection optical system as set forth in claim 2.